

5 (a) Define electric potential at a point.

.....

.....

..... [2]

(b) A hydrogen atom may be considered to consist of a proton and an electron separated by a distance of 120 pm, as shown in Fig. 5.1.

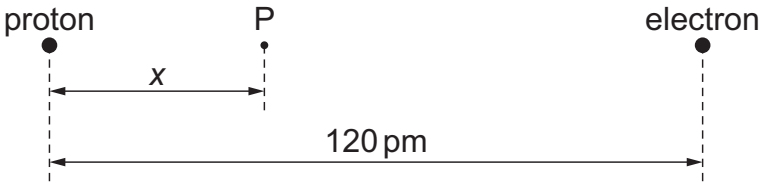


Fig. 5.1

The two particles may be considered as point charges.

Point P lies on the line joining the electron and the proton and is at a variable distance x from the proton.

(i) Show that the electric potential V at point P when $x = 10\text{ pm}$ is equal to 130 V.

[2]

(ii) Calculate, to two significant figures, V when $x = 30\text{ pm}$.

$V = \text{.....} \text{ V}$ [2]

(iii) On Fig. 5.1, draw a cross (x) at one position, other than infinity, where the electric potential is zero. [1]

(iv) On Fig. 5.2, sketch the variation of V with x between $x = 10\text{ pm}$ and $x = 110\text{ pm}$.

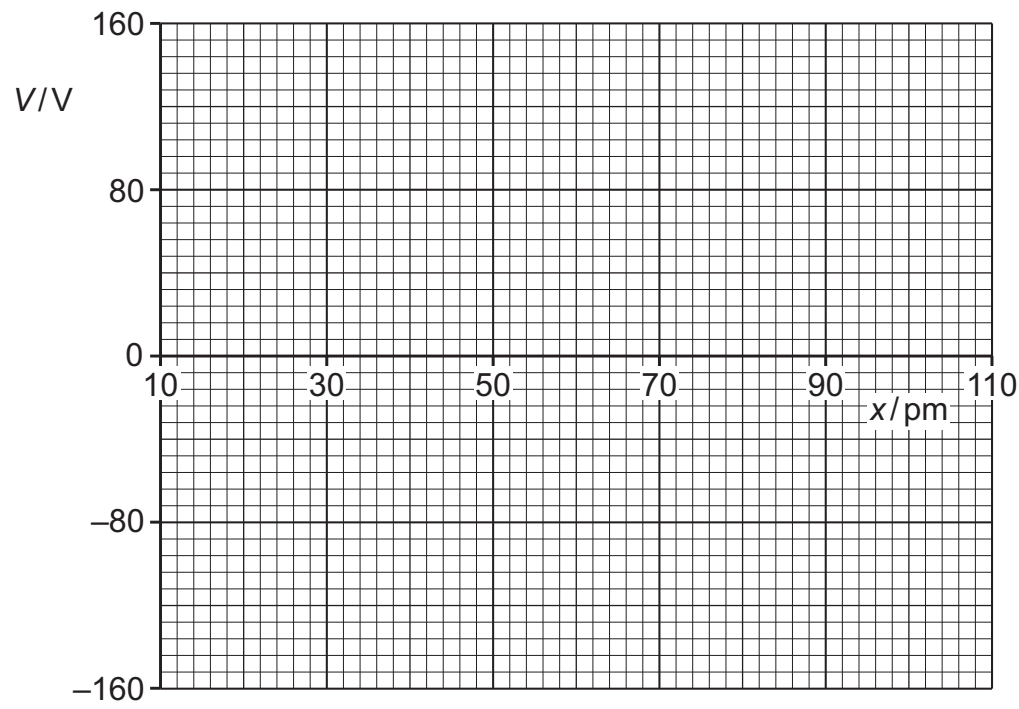


Fig. 5.2

[3]

[Total: 10]